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IS 15685 (2006): Purchaser's data sheet for power boiler
[MED 1: Boilers and Pressure Vessels]

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पावर बायलर के लिए क्रेता का आँकड़ा पत्र

Indian Standard

PURCHASER'S DATA SHEET FOR POWER BOILER

ICS 27.060.01

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

October 2006 **Price Group 4**

Boilers and Pressure Vessels Sectional Committee, ME 01

FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Boilers and Pressure Vessels Sectional Committee had been approved by the Mechanical Engineering Division Council.

The information given by a purchaser according to this data sheet will enable a manufacturer or supplier to assess the exact requirements of the purchaser and recommend to the most suitable type of equipment.

The composition of the Committee responsible for the formulation of this standard is given at Annex A.

For the purpose of deciding whether a particular requirement of this standard is complied with the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

PURCHASER'S DATA SHEET FOR POWER BOILER

1 SCOPE

This standard covers the minimum technical data to be supplied by a purchaser, while placing an enquiry or order to a supplier for the purchase of a utility boiler.

2 PURCHASER'S DATA SHEET

2.1 General Information

a) Manufacturer :
b) Type of boiler :
c) Number of boilers :
d) Design code : Indian Boiler Regulations (I.B.R)

3 STANDARDS AND CODES

The following standards and regulations are applicable:

IS No./Regulation	*Title*
8753 : 1977	Code for acceptance tests on stationary steam generators of the power station type
I.B.R. : 1950	Indian Boiler Regulations

NOTE — Any other National/International Standards for the equipment/items not covered under I.B.R.

4 PARAMETERS AT THE BATTERY LIMIT OF THE BOILER

4.1 Boiler Parameters

Boiler parameters shall be as per Table 1.

4.2 Fuel

4.2.1 *Type of Fuel* : Coal/Oil/Natural gas/Other fuels

a) Main fuel :
b) Auxiliary fuel :
c) Stabilizing fuel :
d) Start up fuel :

4.2.2 *Physical Properties*

4.2.3 *Supply Parameters (as applicable)*

a) Supply pressure :
b) Specific gravity :
c) Whether filtered or not :
d) Maximum size of solid particles and percentage solids per standard counter :
e) Temperature :

4.2.4 *Fuel Analysis*

Fuel analysis shall be as per Tables 2, 3 and 4 for coal, oil and gas respectively.

4.3 Utility Requirements

a) Cooling water : Pressure/Temperature
Rise in cooling water temperature, °C
b) Instrument air with oil free, due (–40°C) at operating pressure : Pressure/Temperature
c) Service air : Pressure/Temperature

4.4 Cooling Water Analysis

a) Suspended solids hardness;
b) Total dissolved solid, in ppm; and
c) Chlorides, in ppm.

4.5 Demineralized Feed Water Analysis

4.6 Instrument Air

a) Quantity, in m^3/h at NTP;
b) Pressure, in bar; and
c) Temperature, in °C.

4.7 Service Air

a) Pressure, in bar; and
b) Temperature, in °C.

4.8 Auxiliary Steam Parameter, If Available

4.9 Site Data

a) Approach to site/plant location :
b) Elevation above mean sea level, m :
c) Ambient temperature, °C
  1) Maximum :
  2) Minimum :
  3) Average :
  4) Design :

Table 1 Boiler Parameters

(*Clause* 4.1)

Sl No.	Description	100 Percent BMCR	100 Percent TMCR	100 Percent TMCR VWO Condition	60 Percent TMCR	100 Percent TMCR with All HP HTR Out Condition
(1)	(2)	(3)	(4)	(5)	(6)	(7)
i)	Main steam: a) Superheater outlet steam flow, t/h b) Superheater outlet pressure, kg/cm^2 c) Superheater outlet temperature, °C					
ii)	Re-heat steam: a) Reheater outlet steam flow, t/h b) Steam pressure at re-heater inlet, kg/cm^2 c) Steam pressure at re-heater outlet, kg/cm^2 d) Steam temperature at re-heater inlet, °C e) Steam temperature at re-heater outlet, °C					
iii)	Feedwater: a) Feedwater flow, t/h b) Feedwater temperature at economiser inlet, °C c) Feed water pressure, kg/cm^2 d) Spray water temperature, °C					

NOTES

1 BMCR — Boiler Maximum Continuous Rating (This shall account auxiliary steam quantity and turbine over pressure condition).
TMCR — Turbine Maximum Continuous Rating.
VWO — Valves Wide Open.
HP HTR Out Condition — High pressure heaters not working.

2 Indicate spray water tapping point.

Table 2 Fuel Analysis — Coal

(*Clause* 4.2.4)

Sl No.	Description	Design Coal	Worst Coal	Best Coal
(1)	(2)	(3)	(4)	(5)
i)	Proximate analysis (Percent by weight):			
	a) Fixed carbon, percent			
	b) Volatile matter, percent			
	c) Moisture, percent			
	d) Ash, percent			
	e) Total, percent			
	f) GCV (Gross Calorific Value), kcal/kg			
ii)	Ultimate analysis (Percent by weight):			
	a) Carbon, percent			
	b) Hydrogen, percent			
	c) Sulphur, percent			
	d) Nitrogen, percent			
	e) Oxygen (diff), percent			
	f) Moisture, percent			
	g) Ash, percent			
	h) Hard grove index			
	j) Abrasive index (YGP index), mgm/kg			
iii)	Ash fusion characteristics:			
	a) IDT — Initial Deformation Temperature, °C			
	b) ST — Softening Temperature $H = W_1$, °C			
	c) HT — Hemispherical Temperature $H = W_2$, °C			
	d) FT — Fusion Temperature, °C			
iv)	Ash characteristics (Percent by weight):			
	a) A — SiO_2, percent			
	b) A — Al_2O_3, percent			
	c) B — Fe_2O_3, percent			
	d) B — CaO, percent			
	e) B — MgO, percent			
	f) B — Na_2O, percent			
	g) B — K_2O, percent			
	h) A — TiO_2, percent			
	j) P_2O_5, percent			
	k) SO_3, percent			
	m) Base/Acid ratio			
	n) Fe_2O_3/CaO ratio			
	p) Chloride			

Table 3 Fuel Analysis — Oil

(*Clause* 4.2.4)

Sl No.	Description	Design Fuel	Alternate Fuel
(1)	(2)	(3)	(4)
i)	Analysis (Percent by weight): a) Carbon, percent b) Hydrogen, percent c) Oxygen, percent d) Nitrogen, percent e) Sulphur, percent f) Moisture, percent g) Ash, percent h) Chlorine, percent Total		
ii)	Calorific value: a) GCV (as recorded), kcal/kg b) NCV (as recorded), kcal/kg		
iii)	Additional data: a) Phosphorous, ppm b) Vanadium, ppm c) Sodium, ppm		
iv)	Properties: a) Specific gravity @ …… °C b) Fire point, °C c) Flash point, °C d) Viscosity @ …… °C cSt[1] e) Specific heat, kcal/kg		

NOTE — Fuel analysis for light up and load carrying/support fuel is also required, if different from above.

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[1] cSt — centistokes.

Table 4 Fuel Analysis — Gas (Molecular Basis) Gas Supply Pressure

(*Clause* 4.2.4)

Sl No.	Description	Molecular Basis
(1)	(2)	(3)
i)	Volumetric analysis (Percentage): 1) Hydrogen (H_2) 2) Carbon monoxide (CO) 3) Methane (CH_4) 4) Ethane (C_2H_6) 5) Propane (C_3H_8) 6) *n*-Butane (C_4H_{10}) 7) Isobutane (C_4H_{10}) 8) *n*-Pentane (C_5H_{12}) 9) Isopentane (C_5H_{12}) 10) Neopentane (C_5H_{12}) 11) *n*-Hexane (C_6H_{14}) 12) Ethylene (C_2H_4) 13) Propylene (C_3H_6) 14) Butylene (C_4H_8) 15) *n*-Pentane (C_5H_{10}) 16) Hexene (C_6H_{12}) 17) Benzene (C_5H_6) 18) Toluene (C_7H_8) 19) Ammonia (NH_3) 20) Hydrogen sulfide (H_2S) 21) Xylene (C_8H_{10}) 22) Water vapour (H_2O) 23) Organic sulphur 24) Carbon dioxide (CO_2) 25) Nitrogen (N_2) 26) Oxygen (O_2) 27) Argon (Ar) Total	
ii)	Calorific value: a) GCV, kcal/m^{3}N b) NCV, kcal/m^{3}N	
iii)	Density, kg/m^{3}N	

d) Relative humidity, Percent:
  1) Maximum :
  2) Minimum :
  3) Average :
  4) Design :

e) Rainfall (annual), mm:
  1) Maximum :
  2) Minimum :
  3) Average :
  4) Maximum rainfall in a period of 1h :

f) Environmental conditions:
  1) Wind velocity :
  2) Wind pressure :
  3) Seismic zone :
  4) Seismic co-efficient :
  5) Soil bearing co-efficient for foundation :

g) Nearest city, railway siding, port, highway

4.10 Characteristic of Electrical Supply Available (HT/LT and DC Power)

a) Voltage,

b) Frequency,
c) Phase,
d) 3 wire/4 wire system, and
e) Percentage variation of:
  1) Voltage
  2) Frequency

NOTE — For guarantee and performance test the above data shall be separately specified by the purchaser.

4.11 Scope of Supply and Services

a) Brief description of the following scope of supply of steam boiler and auxiliary equipment is to be furnished:
  1) Pressure parts, type of water wall, drum, spray attemperators, integral piping
  2) Airheater (Tubular/Rotary)
  3) Fuel preparation and firing equipment including burner and wind box
  4) Electrostatic precipitator or bag filter
  5) Fans (FD, ID, PA, Seal air, Scanner air, etc)
  6) C&I items
  7) Electrical items
  8) Sootblowers
  9) Handling equipments
  10) Flues and ducts
  11) Control valves, safety valves and other valves, silencers
  12) Boiler supporting steel work, airheater and duct supports, galleries, ladders and hand rail
  13) Interfacing/connections for ash handling and coal handling
  14) Drains, vents, CBD and IBD tanks
  15) Chimney (type, size, height and lightning arrestor)
  16) Painting
  17) Chemical cleaning, LP and HP dosing system
b) Design criteria:
  1) Forced circulation/natural circulation
  2) Furnace volumetric heat release rate, heat input per plan area rating, heat release rate at burner zone
  3) Residence time
  4) Furnace pressure (mm of water)
  5) Water holding capacity of drum
  6) Operating mode (two shift, fixed pressure, sliding pressure)
  7) Feed water and boiler water quality
  8) Steam purity
  9) Expected boiler efficiency
  10) Emission norms
c) Terminal points and exclusions
d) Spares — Recommended/Mandatory/ Commissioning
e) Initial fill of lubricants, special tools, etc
f) Testing and inspection
g) Project schedule
h) Erection and commissioning/Supervision
j) Performance guarantee test
k) Other services to be provided
m) Safety rules
n) Any other detail

4.12 Performance Guarantees

a) Maximum evaporation
b) Superheater steam outlet temperature
c) Re-heater steam outlet temperature
d) Superheater steam outlet pressure
e) Maximum pressure drop across re-heater circuit
f) Efficiency at 100 percent TMCR
g) Auxiliary power consumption at 100 percent TMCR
h) Emission levels for worst coal at 100 percent BMCR

ANNEX A

(*Foreword*)

COMMITTEE COMPOSITION

Boilers and Pressure Vessels Sectional Committee, ME 01

Organization	*Representative(s)*
Central Boilers Board, New Delhi	Shri V. K. Goel (***Chairman***) Shri M. L. Ahuja (*Alternate*)
Alstom Projects India Ltd, Durgapur/Delhi	Shri Ramesh T. Yavagal Shri P. K. Pal (*Alternate*)
Bharat Heavy Electricals Ltd, Tiruchirapalli	Shri G. Uma Shanker Shri K. Padmanaban (*Alternate*)
Bharat Heavy Plate and Vessels Ltd, Visakhapatnam	Shri M. S. V. S. N. Murthy Shri C. H. Ramanaiah (*Alternate*)
Bureau Veritas, Mumbai	Shri A. U. M. Rao Shri V. Kumar (*Alternate*)
Central Electricity Authority, New Delhi	Shri A. K. Gupta Shri D. K. Gilhotra (*Alternate*)
Central Mechanical Engineering Research Institute (CSIR), Durgapur	Shri P. R. Samaddar Shri P. K. Sen (*Alternate*)
Chief Inspector of Boilers, Chennai	Shri T. K. Thambithurai Shri Thiru K. Regunath (*Alternate*)
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Development Consultants Pvt Ltd, Kolkata	Shri Dipak K. Sarkar Shri Asim Kumar De (*Alternate*)
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Indian Boilers Manufacturers' Association, Mumbai	Shri N. B. Tapaswi
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Indian Register of Shipping, Mumbai	Shri A. K. Sharma Shri I. Majumdar (*Alternate*)
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Lloyd's Register Asia, Mumbai	Shri B. Saraswat Shri P. K. Banerjee (*Alternate*)
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Oil Industries Safety Directorate, New Delhi	Shri S. C. Gupta Shri Shamsher Singh (*Alternate*)
Petroleum and Explosive Safety Organization, Nagpur	Shri M. Anbunathan Shri A. N. Biswas (*Alternate*)
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Organization	*Representative(s)*
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Welding Research Institute, Tiruchirapalli	Shri G. Uma Shanker
In personal capacity (*Qualiquest Industrial Services, 26, Manak Vihar, New Delhi*)	Shri M. G. K. Rao
BIS Directorate General	Scientist 'F' and Head (MED) [Representing Director General (*Ex-officio*)]

Member Secretary
Shri C. K. Veda
Scientist 'F' and Head (MED), BIS

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